ABSTRACT OF THE DISCLOSURE

A microelectrophoresis chip comprises a substrate in which there are formed one or more channels, one channel for each sample to be evaluated. The channels extend for the length of the chip, a distance of generally around 1 cm, and are about 1 to 10 μm wide and 1 to 10 μm in depth. The channels are filled with a homogeneous separation matrix which acts as an obstacle to the electrophoretic migration of the charged molecules. Microelectrodes disposed in the channels are used to induce an electric filed within the homogeneous separation medium. When a voltage is applied across two or more of the microelectrodes, the charged molecules are induced to move and separate according to the electric field density, the type of solvent film, and the charge, shape and size of the charged molecule. The chip may further comprise detectors, such as light polarization detectors, fluorescence emission detectors, biosensors, electrochemical sensors or other microcomponents which may include sites for enzymatic or chemical manipulation of the moved or separated charged molecules.